



testo 316-1 gas leak detector
0560 3162

Instruction manual



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1 About this document

- The instruction manual is an integral part of the instrument.
- Please keep this documentation available for future reference.
- Always use the complete original instruction manual.
- Please read this instruction manual through carefully and familiarize yourself with the product before putting it to use.
- Hand this instruction manual on to any subsequent users of the product.
- Pay particular attention to the safety instructions and warning advice in order to prevent injury and damage to the product.

2 Safety and disposal

2.1 Security

General safety instructions

- Only operate the product properly, for its intended purpose, and within the parameters specified in the technical data.
- Do not apply any force.
- Do not operate the instrument if there are signs of damage to the housing or connected cables.
- Dangers may also arise from objects to be measured or the measuring environment. Always comply with the locally valid safety regulations when carrying out measurements.
- Do not store the product together with solvents.
- Do not use any desiccants.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly when doing the work.
- Use only original spare parts from Testo.

Batteries

- Improper use of batteries may cause the batteries to be destroyed, or lead to injury due to current surges, fire or escaping chemicals.
- Only use the batteries supplied in accordance with the instructions in the instruction manual.
- Do not short-circuit the batteries.
- Do not take the batteries apart and do not modify them.

3 Product-specific information

- Do not expose the batteries to heavy impacts, water, fire or temperatures in excess of 60 °C.
- Do not store the batteries in the proximity of metal objects.
- In the event of contact with battery acid: rinse affected areas thoroughly with water, and if necessary consult a doctor.
- Do not use any leaky or damaged batteries.

Warnings

Always pay attention to any information denoted by the following warnings. Implement the precautionary measures specified!

 **DANGER**

Risk of death!

 **WARNING**

Indicates possible serious injury.

 **CAUTION**

Indicates possible minor injury.

 **CAUTION**

Indicates possible damage to equipment.

2.2 Disposal

- Dispose of faulty rechargeable batteries and spent batteries in accordance with the valid legal specifications.
- At the end of its useful life, deliver the product to the separate collection point for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.



-  WEEE Reg. No. DE 75334352

3 Product-specific information

- Do not carry out measurements on live components.
- Do not operate the instrument in environments above 80 %RH (condensing).
- Observe the permissible storage and transport temperatures and the permissible operating temperature (e.g. protect the measuring instrument from direct sunlight)!
- Always carry out a function test before searching for gas leaks.

- If the instrument is misused or subjected to force, all warranty claims will be voided!
- Do not allow the sensor to come into contact with moisture or acids, as it will react cross-sensitively.

4 Intended use

The testo 316-1 is a gas leak detector for the short-term detection of leaks in gas systems.

The following substances can be detected:

- Methane CH_4
- Propane C_3H_8
- Butane C_4H_{10}
- Hydrogen H_2

The instrument is not suitable for precise measurement of the gas concentration.

ATTENTION

Restrictions on the field of use

- **Do not use the instrument in potentially explosive atmospheres!**
 - **Do not use the instrument as a monitoring instrument for personal safety! The instrument is not protective equipment!**
 - **Do not use the instrument as a gas analyzer! The sensor detects almost all combustible gases alike.**
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5 Product description

5.1 Instrument overview



1	Sensor head with gas sensor	2	Sensor LED
3	Flexible sensor tube	4	Display
5	Control keys	6	Battery compartment (on rear)

Symbol explanation

	Do not allow children under 6 years of age to play with batteries.
	Do not throw batteries in the trash.
	Do not charge batteries.
	Do not place batteries near fire.
	Batteries are recyclable.

6 First steps

6.1 Inserting/changing batteries

- ✓ The instrument is switched off.
- 1 Open the battery compartment (on the back of the instrument) via the snap lock.
- 2 Insert batteries/rechargeable batteries (pay attention to the polarity!).
- 3 Close the battery compartment.



When not in use for a long period: Take out the (rechargeable) batteries.

6.2 Getting to know the product

6.2.1 Switching the instrument on and off

Switching on

Only switch on the instrument in fresh air, since automatic zeroing is carried out when the instrument is switched on. The ambient temperature and ambient humidity during zeroing should correspond to the ambient conditions at the measuring location. If necessary, zero again manually at the measuring location (switch off and on again).



If the unit is not used for a prolonged period of time, the sensor will become contaminated. Particularly if the instrument has not been in operation for a prolonged period of time (> 2 weeks), it should be left switched on for a while before being used. The longer it has not been in operation, the longer this additional warming-up phase should be. Please note that the instrument switches itself off by default after 10 min of inactivity.

- 1 Press and hold down (1 sec) the **On/Off** key.

Warm-up phase (HEAT)

- ▶ The instrument starts up. With regular use, the warm-up period takes approx. 20 sec and is symbolized by the text "HEAT" and a countdown.
As long as the sensor LED is flashing orange, the instrument is not ready for use.

- ▶ Following the warm-up period, the measurement view is displayed.

Self-cleaning (CLN)

- ▶ If the sensor is dirty, the warm-up phase is followed by the sensor cleaning phase. This usually happens when the instrument has not been used for several days. The self-cleaning is symbolized by the text "CLN" and a countdown.

Switching off

CAUTION

Caution! Risk of burns due to hot sensor head after prolonged operation.

- **Before touching the sensor head or packing the instrument: switch instrument off and let the sensor head cool down.**

- 1 Press and hold down (1 sec) the **On/Off** key.
 - ▶ The instrument is switched off.

Auto OFF

After 10 minutes of inactivity (no user input, no gas concentration above the warning threshold), the instrument switches itself off. The switch-off is signalled beforehand by an alarm sound, red flashing of the sensor LED and a 10 sec countdown.

You can prevent the instrument from switching off by pressing any key within 10 seconds.

Enabling/disabling the Auto-OFF function:

- 1 Press the **Sound** and **UNIT** keys simultaneously for 1 sec.
 - ▶ Enabling/disabling is confirmed by "AOFF ON" or "AOFF OFF".

7 Using the product

7.1 Controls

- ✓ The instrument is switched on.
- ▶ Settings and controls are implemented via the instrument.



1	Sound / Illumination key
2	On/Off / GAS key
3	Bar display
4	Measurement parameter
5	Display for alarm signal, battery
6	Maximum measured value
7	Current measured value
8	Unit of value
9	->0<- / max ->0<- key
10	unit key

7.1.1 Implementing settings

Selecting, opening and setting functions

- 1 Press the relevant key to select the functions






Secondary assignment (long press)



All keys with a white corner have a secondary assignment, which can be selected by pressing and holding the key (1 sec).

Adjustable functions



Ensure correct settings: all settings are transferred immediately. There is no Cancel function.

Function	Setting options/comments
On/Off (long press) 	Switches the instrument on or off
Measurement parameter 	Cycle through CH ₄ (methane), C ₃ H ₈ (propane), C ₄ H ₁₀ (butane) or H ₂ (hydrogen)
Display illumination (long press) 	OFF (display illumination not active) or ON (display illumination active)
Alarm sound 	ON (acoustic alarm on) or OFF (acoustic alarm off). The frequency of the alarm sound increases as the concentration increases.
Unit 	Switch between PPM and %LEL

Function	Setting options/comments
Max. zeroing (long press) 	Zero maximum reading
Zeroing 	Zero current reading, up to 250 ppm can be suppressed. Symbolized by an arrow pointing downwards on the display.

7.2 Carrying out a function test

- 1 | Apply low-concentration gas to the sensor (max. 10 sec).
- ▶ | If the sensor does not respond (no alarm), the instrument is defective and must no longer be used. The instrument must be taken to the service centre for repair.



Due to the selectivity of the sensor, gas equivalents are not suitable for checking the function and especially not for calibrating the sensor.

7.3 Carrying out gas detection

ATTENTION

Destruction of the sensor due to external influences!

- Do not expose the sensor to high concentrations of H₂S (hydrogen sulphide), SO_x (sulphur dioxides), Cl₂ (chlorine), or HCl (hydrogen chloride).
- > Prevent alkaline materials or water from coming into contact with the sensor.
- > Do not expose the sensor to moisture or frost.



Have the instrument serviced annually by the manufacturer.



Testing natural gas lines or hydrogen lines:

Methane (main component of natural gas) or hydrogen are lighter than air, detection should be carried out above the pipe / suspected leak.

Testing propane and butane gas lines: Propane and butane are heavier than air, detection should be carried out below the pipe / suspected leak, starting from the bottom and working upwards.

Selecting the gas to be detected

- 1 Use the **GAS** key to select the gas types.
 - ▶ After switching on the instrument, the process of cycling through starts with methane (CH₄).

Carrying out the measurement

- 1 Move the sensor head as close as possible and at low speed (approx. < 2 cm per second) over the components that are to be checked for leaks.
The surface of the sensor must not be covered.
 - ▶
 - Concentration < 100 ppm: The sensor LED and the display illumination light up green. In addition, the bar display increases.
 - Concentration > 100 and < 999 ppm: The sensor LED and the display illumination light up yellow. In addition, the bar display increases.
 - Concentration > 999 ppm: The unit changes to VOL% and the bar display increases.
 - Concentration > 9999 ppm / > 0.99 VOL%: The sensor LED and the display light up red (alarm threshold).
 - ▶ When the lower explosive limit is reached, ">LEL" is displayed. Higher values are not displayed.
 - ▶ If the warning threshold (100 ppm) is exceeded, the sensor LED and display illumination light up yellow. If the acoustic alarm is enabled, an additional warning sound is emitted when the warning threshold is exceeded, the frequency of which increases as the concentration increases, and changes to a continuous tone when the second alarm threshold (10,000 ppm) is exceeded.

Changing units

By default, the display shows ppm (concentration in parts per million). From a concentration of >999 ppm, the display changes to vol% (1000 ppm=0.1 vol%). In addition, %LEL (the percentage of the lower explosive limit that has been reached) can be selected.

- 1 Press the **unit** key to change the unit.

Carrying out manual zeroing

The zero point can only be set manually if the currently detected gas concentration is below the max. 250 ppm (max. 250 ppm can be suppressed). For example:

- 150 ppm (\leq 250 ppm): are completely suppressed (display: 0 ppm)
- 1000 ppm ($>$ 250 ppm): 250 ppm are suppressed (display: 750 ppm)



Gas concentrations present at the time of zeroing are suppressed by zeroing. As a result, the displayed reading no longer corresponds to the real gas concentration.

-
- ✓ The instrument is in measurement view.
 - 1 Briefly press [\rightarrow 0 \leftarrow].
 - ▶ The zero point for the current reading is reset or the current suppression is cancelled.
 - ▶ On instruments with a display, the suppression of the reading is symbolized by an arrow pointing downwards on the display.



The maximum reading can be zeroed using [$\text{max} \rightarrow$ 0 \leftarrow].

After the measurement

- 1 Ventilate the sensor thoroughly after each use. To do this, place the instrument in fresh air for approx. 2 minutes before using it again.

8 Maintaining the product

8.1 Changing batteries

The instrument indicates that the battery needs to be changed via a flashing, empty battery symbol.

To change the battery, see the section "Inserting/changing batteries".

8.2 Cleaning the instrument

- 1 If the housing of the instrument is dirty, clean it with a damp cloth.



Do not use any aggressive cleaning agents or solvents! Mild household cleaning agents and soap suds may be used.

Storage & transportation

To prevent contamination of the sensor, please do not store or transport the instrument in an environment where any tobacco smoke, foul air, oils, greases, silicones, evaporating liquids or gases are present. Any sensor that is

contaminated as a result of storage or transportation must be cleaned before use, see Cleaning the sensor.

Regular inspection

Testo recommends having the gas leak detector inspected by an authorized service centre every year.

8.3 Cleaning the sensor

Tobacco smoke, dirty air, oils, greases, silicones and evaporating liquids or gases can leave deposits on the sensor surface. Possible consequences are reduced sensitivity, distorted displays of gas concentration or display of a background concentration. Clean the sensor if necessary

- 1 Switch on the instrument, allow it to initialize and then switch it off. Repeat this procedure several times.
- 2 If it is dirty, clean the sensor head with a soft, dry cloth.

Switching on regularly

If the instrument is used infrequently, deposits may build up on the sensor. Switching the instrument on prevents these deposits from building up on the sensor. Testo recommends switching the instrument on regularly to avoid deposits building up on the sensor.

Changing the sensor head

The instrument has a permanently installed sensor head that can only be replaced by Testo Customer Service.

9 Technical data testo 316-1

Feature	Value
Measurement parameters	Ppm Vol % % LEL
Detectable gases	Methane, propane, hydrogen, butane
Lower response threshold / Measuring range	Methane (CH ₄): 50 ppm to 4.0 vol.% Propane (C ₃ H ₈): 50 ppm to 1.9 vol.% Hydrogen (H ₂): 50 ppm to 4.0 vol.% Butane (C ₄ H ₁₀): 50 ppm to 1.5 vol.%
Resolution (via app)	1 ppm 0.01 VOL% 1% LEL
Response time	Response time < 2 sec

Feature	Value
Leak alarm	3-colour LED on sensor head 3-colour display backlighting Acoustic
Operating temperature	-20 to +50 °C
Operating humidity	0 to 80 %RH
Operating altitude	≤ 2000 m
Storage temperature	-20 to 50 °C
Battery type	6x Alkaline 1,5 V, AA (included in scope of delivery)
Max. power rating	2 W @ 9 V DC
Battery life	>15 h
Pollution degree	PD2
IP class	IP 40
Dimensions	150 x 66.5 x 37.5 mm (L x W x H) Length with gooseneck arm 545 mm
Weight	415 g

10 Tips and assistance

10.1 Questions and answers

Question	Possible cause	Possible solution
Zero point is unstable	Contamination of the sensor after a prolonged period of non-use	Leave the instrument switched on until the zero point has stabilized.
Instrument does not switch to measuring mode (remains in warm-up phase)	Battery voltage too low	Replace batteries.

10.2 Error codes

Error code	Error
E001	Memory error
E002	Sensor error

The error code is shown on the display.

10.2.1 Hard Reset

- 1 If you encounter any problems with the firmware, press and hold the **ON/OFF** key for a long time (4 sec.) to perform a reset.

10.3 Accessories and spare parts

Description	Order no.
VARTA Industrial Pro Alkaline LR 6/AA	0515 0414
Transport bag	0590 0018

11 Support

You can find up-to-date information on products, downloads and links to contact addresses for support queries on the Testo website at: www.testo.com.

If you have any questions please contact your local dealer or the Testo Customer Service. You can find contact details on the back of this document or online at www.testo.com/service-contact.



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